A REVIEW OF PRODUCT RECOVERY RATES FOR ALASKA GROUNDFISH

by

Loh-Lee Low,[1] Janet E. Smoker,[1] Leslie J. Watson,[3]
Jerald D. Berger,[1] and Mel W. Eklund[4]

[1]Alaska Fisheries Science Center
National Marine Fisheries Service, NOAA
7600 Sand Point Way NE
Seattle, WA 98115

[1]Alaska Regional Office
National Marine Fisheries Service, NOAA
P. O. Box 1668
Juneau, AK 99802

[3]Alaska Department of Fish and Game
P. O. Box 686
Kodiak, AK 99615

[4]Northwest Fisheries Science Center
2725 Montlake Blvd. E.
Seattle, WA 98112

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ABSTRACT

This paper presents product recovery rates for 26 major product forms produced from 56 Alaskan groundfish species or species groups. These rates are essentially the same as those currently in use in Alaskan waters: the chief exception is the use of a single rate for roe production in the pollock roe. fishery. It is proposed that the rates presented herein-(subject to further modification through industry review) be used as the standard product recovery rates to back calculate the 1990 groundfish catches in Alaskan waters.

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INTRODUCTION

In June 1989, the North Pacific Fishery Management Council passed Amendment 18/13 to the Alaska groundfish fishery management plans to implement a comprehensive program for data gathering in groundfish fisheries (NPFMC 1989). As part of this program, the fishing industry is required to submit weekly production reports to the National Marine Fisheries Service (NMFS) from which raw quantities of fish can be back calculated. Large fish catches encountered in the Alaska groundfish fisheries are typically estimated by-using the hail weight, with large variations in accuracy: products and product weights are more accurately inventoried. From the weekly production reports of each product form, it is possible to use standard recovery rates to back calculate the catch weights of the species from which the products came.

The purpose of this report is to determine standard product recovery rates for all the product forms that are processed from the groundfish species harvested off Alaska. It is also the intent of the authors that industry review this report and inform NMFS of any corrections owing to changes that have taken place in the industry. The technical team analyzing product recovery recommends that a standardized set of product recovery rates for each product form be determined before each year's fishery and be used throughout the year.

METHODS

Technical Team

The coordinators of the product recovery technical team and their affiliations are as follows:

Loh-Lee Low	Alaska Fisheries Science Center, NMFS
Janet Smoker	Alaska Regional Office, NMFS
Jerald Berger	Alaska Fisheries Science Center, NMFS
Leslie Watson	Alaska Department of Fish and Game (ADF&G)
Mel Eklund	Northwest Fisheries Science Center, NMFS

To derive this report, the Team drew upon information from published reports, analyzed and reviewed new data, and sought the views of the Alaska groundfish plan teams. The Team wishes to acknowledge the many members of the ADF&G and NMFS staff who provided data, analyses, and technical review for this exercise.

Reports and Data Reviewed

The following are the main reports and data reviewed by the technical team:

1. Product recovery rates used by the ADF&G and the NMFS Regional Office in Alaska. Rates are developed for 70 species groups found off Alaska by 28 major product forms. This information became the model data set from which rates were modified using additional data identified below.

2. Observer data, 1983-85. These data have been analyzed for 15 species and 9 product forms by the Resource Ecology and Fisheries Management Division and reported in NOAA Technical Memorandum F/NW-129 (Berger and Hare 1988). The report gives data on species, gear type, International North Pacific Fisheries Commission statistical area, fishing season, sample size, size range and mean length of fish, product recovery rates (minimum, maximum, and mean), and standard error and confidence levels of product recovery rates.

3. Observer data, 1986-present. These raw data were analyzed only to fill data gaps and refine product recovery rates in the walleye pollock (Therasra chalcosramma) roe fishery. In general, the Team believes that a more detailed analysis of the data for other product forms would not add substantially to the information already reported in NOAA Technical Memorandum F/NWC-129.

4. Recoveries and yields from Pacific fish and shellfish contained in Alaska Sea Grant publication, Marine Advisory Bulletin No. 37 (CrapO et al. 1988). This publication contains generalized data.

5. General data on conversion factors compiled for species throughout the United States by the National Fishery Statistics Program, NMFS, Washington, D.C.

Consultations

On 7 June, the Bering Sea and Gulf of Alaska groundfish plan teams were consulted about using product recovery rates to back calculate gross catches. The teams expressed the desire to a) keep the procedure simple: b) use only a mean rate for each species and product form, instead of including ranges or variances; c) publish rates after the September Council. meeting so that the public will have almost 3 months to comment: d) modify rates according to public comments: e) accept rates in December; and f) resist adjusting product recovery rates during the fishing year--any new recovery rate data collected during the fishing season should be used to adjust rates for the following year.

The Technical Team agreed with the suggestions of the Plan Teams and chose the product recovery rates used by ADF&G and NMFS as the standards to which adjustments would be made.

The Team determined that most of the product recovery rates were reasonable and needed no adjustment with the exception of those used in the pollock roe fishery. The standards listed pollock roe recovery rates ranging from 3 to almost 20%. The observer data base from 1983 to 1985 was, therefore, analyzed to refine these rates.

RESULTS

Pollock Roe Recovery Rates

The U.S. Foreign Fisheries Observer Program embarked on a study of pollock roe recoveries during 1983-85. Samples were collected annually in the Shelikof Strait area and in the Bering Sea in 1985. Product recovery rate information is presented in Tables 1 and 2.

These tables show a wide range of product recovery rates within each category. Part of this is due to the subjective determination of the dividing line between premature and mature pollock, and between mature and hydrated pollock.‘ In this study, premature fish are separated from mature fish when there is a noticeable upward change in product recovery rate. Hydrated fish are separated from mature fish when the roe sac contains 25% or more hydrated eggs.

Examination of the data showed that the more fully hydrated egg sacs are heavier (and had a higher recovery rate) than those less hydrated, but are also less desirable and frequently not retained. Very few premature roe sacs were encountered in this study as fishing typically did not occur during this stage. Another factor contributing to the variability of roe recovery rates is volume of the catch. Large hauls of pollock tax the processing capabilities of a vessel and so it may choose to retain only roe sacs of the fullest and highest quality. Roe that would normally be retained in hauls with small amounts of

pollock may not be retained in hauls with larger amounts. Very few samples (25) were collected from the Bering Sea, and those that were collected had roe recovery rates similar to the rates found in Shelikof Strait.

For the above reasons, we suggest using only one roe recovery rate for both areas and all maturity stages. The overall average for "total weight of roe divided by total weight of pollock" is 6.50%. The overall average for "total weight of roe divided by weight of females carrying usable "roe" is 13.75%. Since the common denominator is total weight of pollock, the standard roe recovery rate for pollock to be used is 6.5%. If male and undersized female pollock are reported separately as discards or meal in data forms, as they should be, then the higher (13.75%) product recovery rate from female pollock will be used.

Table 1. --Percent pollock roe recovery rates in the Shelikof Straits fishery.

Maturity	Sample Size	Type of Rate	Range	Mean	Median
Premature	12	Roe/Total pollock	1.5-4.0	2.56	2.5
Premature	12	Roe/Usable females	4.6-8.8	6.97	7.1
Mature	173	Roe/Total pollock	2.6-13.3	6.07	5.7
Mature	116	Roe/Usable females	7.4-16.8	12.74	12.8
Hydrated	68	Roe/Total pollock	2.3-16.6	7.83	7.1
Hydrated	69	Roe/Usable females	9.9-20.8	16.04	16.1

Table 2. --Percent roe pollock recovery in the Bering Sea fishery.

Maturity	Sample Size	Type of Rate	Range	Mean	Median
Mature	10	Roe/Total pollock	2.7-10.6	6.50	6.5
Mature	10	Roe/Usable females	6.9-20.1	12.88	12.5
Hydrated	15	Roe/Total pollock	4.3-11.1	8.59	8.5
Hydrated	15	Roe/Usable females	14.8-18.5	16.95	17.1

DISCUSSION

Appendix Tables 1 and 2 contain the list of product forms and product recovery rates for the common groundfish species harvested off Alaska. These are the recommended standard product recovery rates to be used for back calculating raw fish catches for the 1990 groundfish fisheries off Alaska.

The U.S. Fisheries Observer Program will continue to collect product recovery data during the 1990 fishing season. These data will then be used to refine product recovery rates for future years and to fine tune in-season calculations of raw fish catches as may be required.

REFERENCES

Berger, Jerald D., and Steven R. Hare. 1988. Product recovery rates obtained aboard foreign fishing vessels operating in the Northeast Pacific Ocean and eastern Bering Sea, 1983-85. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/N-WC-129, 81 p.

Crapo, Chuck, Brian Paust, and Jerry Babbitt. 1988. Recoveries and yields from Pacific fish and shellfish. Alaska Sea Grant College Program, Univ. Alaska, Marine Advisory Bull. 37, 50 p.

North Pacific Fishery Management Council. 1989. Environmental assessment/regulatory impact review/initial regulatory flexibility analysis for amendment 18 to the fishery management plan for groundfish of the Gulf of Alaska and amendment 13 to the fishery management plan for groundfish of the Bering Sea/Aleutian Islands. Unpubl. manuscr., 205 p. North Pacific Fishery Management Council, P.O. Box 103136, Anchorage, Alaska 99510.

APPENDIX

Appendix Table 1. --List of Alaska product types.

Product code	Description
1	Whole fish/food fish
2	Whole bait
3	Bled only
4	Gutted only
5	Headed and gutted (H & G)
6	Headed, gutted, with roe
7	H & G, Western cut
8	H & G, Eastern cut
9	H & G, with pectoral girdle
10	H & G, tail removed
11	Kirimi
12	Salted and split
13	"Wings"
14	Roe only
16	Heads
20	Fillets with skin and ribs
21	Fillets with skin, no ribs
22	Fillets with ribs, no skin
23	Fillets, no skin or ribs
30	Surimi
31	Minced fish
32	Fish meal
33	Fish oil
97	Other - specify
98	Discarded at sea
99	Landed discard

Appendix Table 2. --Recovery rates for Alaska groundfish products.

Species code	Name of species	Product code	Conversion rate
100	Unspecified groundfish	1	1.00
100	Unspecified groundfish	2	1.00
100	Unspecified groundfish	3	0.98
100	Unspecified groundfish	8	0.62
100	Unspecified groundfish	32	0.17
100	Unspecified groundfish	98	1.00
100	Unspecified groundfish	99	1.00
110	Pacific cod	1	1.00
110	Pacific cod	2	1.00
110	Pacific cod	3	0.98
110	Pacific cod	4	0.85
110	Pacific cod	5	0.63
110	Pacific cod	7	0.64
110	Pacific cod	8	0.58
110	Pacific cod	9	0.60
110	Pacific cod	12	0.45
110	Pacific cod	14	0.05
110	Pacific cod	22	0.25
110	Pacific cod	23	0.25
110	Pacific cod	98	1.00
110	Pacific cod	99	1.00
120	Flounder	1	1.00
120	Flounder	2	1.00
120	Flounder	3	0.98
120	Flounder	4	0.90
120	Flounder	5	0.65
120	Flounder	8	0.58
120	Flounder	22	0.22
120	Flounder	32	0.17
120	Flounder	98	1.00
120	Flounder	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
121	Arrowtooth flounder	1	1.00
121	Arrowtooth flounder	2	l-. 00
121	Arrowtooth flounder	3	0.98
121	Arrowtooth flounder	4	0.90
121	Arrowtooth flounder	5	0.74
121	Arrowtooth flounder	8	0.60
121	Arrowtooth flounder	10	0.62
121	Arrowtooth flounder	22	0.25
121	Arrowtooth flounder	23	0.34
121	Arrowtooth flounder	98	1.00
121	Arrowtooth flounder	99	1.00
122	Flathead sole	1	1.00
122	Flathead sole	2	1.00
122	Flathead sole	3	0.98
122	Flathead sole	4	0.90
122	Flathead sole	5	0.65
122	Flathead sole	8	0.60
122	Flathead sole	22	0.22
122	Flathead sole	98	1.00
122	Flathead sole	99	1.00
123	Rock sole	1	1.00
123	Rock sole	2	1.00
123	Rock sole	3	0.98
123	Rock sole	4	0.87
123	Rock sole	5	0.65
123	Rock sole	6	0.78
123	Rock sole	8	0.58
123	Rock sole	20	0.28
123	Rock sole	22	0.22
123	Rock sole	98	1.00
123	Rock sole	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
124	Dover sole	1	1.00
124	Dover sole	2	1.00
124	Dover sole	3	0.98
124	Dover sole	4	0.90
124	Dover sole	5	0.65
124	Dover sole	8	0.58
124	Dover sole	22	0.22
124	Dover sole	98	1.00
124	Dover sole	99	1.00
125	Rex sole	1	1.00
125	Rex sole	2	1.00
125	Rex sole	3	0.98
125	Rex sole	4	0.90
125	Rex sole	5	0.65
125	Rex sole	8	0.58
125	Rex sole	22	0.22
125	Rex sole	98	1.00
125	Rex sole	99	1.00
126	Butter sole	1	1.00
126	Butter sole	2	1.00
126	Butter sole	3	0.98
126	Butter sole	4	0.90
126	Butter sole	5	0.65
126	Butter sole	22	0.22
126	Butter sole	98	1.00
126	Butter sole	99	1.00
127.	Yellowfin sole	1	1.00
127	Yellowfin sole	2	1.00
127	Yellowfin sole	3	0.98
127	Yellowfin sole	4	0.90
127	Yellowfin sole	5	0.65
127	Yellowfin sole	11	0.48
127	Yellowfin sole	20	0.25
127	Yellowfin sole	22	0.22
127	Yellowfin sole	98	1.00
127	Yellowfin sole	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
128	English sole	1	1.00
128	English sole	2	1.00
128	English sole	3	0.98
128	English sole	4	0.90
128	English sole	5	0.65
128	English sole	22	0.22
128	English sole	99	1.00
129	Starry flounder	1	1.00
129	Starry flounder	2	1.00
129	Starry flounder	3	0.98
129	Starry flounder	4	0.90
129	Starry flounder	98	1.00
129	Starry flounder	99	1.00
131	Petrale sole	1	1.00
131	Petrale sole	2	1.00
131	Petrale sole	3	0.98
131	Petrale sole	8	0.65
131	Petrale sole	98	1.00
131	Petrale sole	99	1.00
132	Sand sole	1	1.00
132	Sand sole	2	1.00
132	Sand sole	3	0.98
132	Sand sole	98	1.00
132	Sand sole	99	1.00
133	Alaska plaice	1	1.00
133	Alaska plaice	2	1.00
133	Alaska plaice	3	0.98
133	Alaska plaice	5	0.65
133	Alaska plaice	12	0.48
133	Alaska plaice	98	1.00
133	Alaska plaice	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
134	Greenland turbot	1	1.00
134	Greenland turbot	2	1.00
134	Greenland turbot	3	0.98
134	Greenland turbot	4	0.90
134	Greenland turbot	5	0.74
134	Greenland turbot	8	0.62
134	Greenland turbot	10	0.60
134	Greenland turbot	20	0.30
134	Greenland turbot	22	0.35
134	Greenland turbot	98	1.00
134	Greenland turbot	99	1.00
135	Greenstripe rockfish	1	1.00
135	Greenstripe rockfish	2	1.00
135	Greenstripe rockfish	3	0.98
135	Greenstripe rockfish	4	0.88
135	Greenstripe rockfish	5	0.60
135	Greenstripe rockfish	7	0.60
135	Greenstripe rockfish	8	0.50
135	Greenstripe rockfish	22	0.25
135	Greenstripe rockfish	98	1.00
135	Greenstripe rockfish	99	1.00
136	Northern rockfish	3	0.98
137	Boccacio rockfish	3	0.98
138	Copper rockfish	3	0.98
139	Other rockfish	1	1.00
139	Other rockfish	2	1.00
139	Other rockfish	3	0.98
139	Other rockfish	4	0.88
139	Other rockfish	5	0.60
139	Other rockfish	7	0.60
139	Other rockfish	8	0.50
139	Other rockfish	20	0.42
139	Other rockfish	22	0.25
139	Other rockfish	98	1.00
139	Other rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
140	Red rockfish (red snapper)	1	1.00
140	Red rockfish (red snapper)	2	1.00
140	Red rockfish (red snapper)	3	0.98
140	Red rockfish (red snapper)	4	0.88
140	Red rockfish (red snapper)	5	0.60
140	Red rockfish (red snapper)	7	0.60
140	Red rockfish (red snapper)	8	0.50
140	Red rockfish (red snapper)	22	0.25
140	Red rockfish (red snapper)	98	1.00
140	Red rockfish (red snapper)	99	1.00
141	Pacific ocean perch	1	1.00
141	Pacific ocean perch	2	1.00
141	Pacific ocean perch	3	0.98
141	Pacific ocean perch	4	0.88
141	Pacific ocean perch	5	0.60
141	Pacific ocean perch	7	0.60
141	Pacific ocean perch	8	0.50
141	Pacific ocean perch	22	0.25
141	Pacific ocean perch	98	1.00
141	Pacific ocean perch	99	1.00
142	Black rockfish	1	1.00
142	Black rockfish	2	1.00
142	Black rockfish	3	0.98
142	Black rockfish	4	0.88
142	Black rockfish	5	0.60
142	Black rockfish	7	0.60
142	Black rockfish	8	0.61
142	Black rockfish	22	0.25
142	Black rockfish	98	1.00
142	Black rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
143	Thornyhead rockfish	1	1.00
143	Thornyhead rockfish	2	1.00
143	Thornyhead rockfish	3	0.98
143	Thornyhead rockfish	4	0.88
143	Thornyhead rockfish	5	0.60
143	Thornyhead rockfish	7	0.60
143	Thornyhead rockfish	8	0.50
143	Thornyhead rockfish	22	0.25
143	Thornyhead rockfish	98	1.00
143	Thornyhead rockfish	99	1.00
144	Unspecified slope rockfish	1	1.00
144	Unspecified slope rockfish	3	0.98
144	Unspecified slope rockfish	4	0.88
144	Unspecified slope rockfish	5	0.60
144	Unspecified slope rockfish	7	0.60
144	Unspecified slope rockfish	8	0.50
144	Unspecified slope rockfish	98	1.00
144	Unspecified slope rockfish	99	1.00
145	Yelloweye rockfish	1	1.00
145	Yelloweye rockfish	2	1.00
145	Yelloweye rockfish	3	0.98
145	Yelloweye rockfish	4	0.88
145	Yelloweye rockfish	5	0.60
145	Yelloweye rockfish	7	0.60
145	Yelloweye rockfish	8	0.50
145	Yelloweye rockfish	12	0.45
145	Yelloweye rockfish	22	0.22
145	Yelloweye rockfish	98	1.00
145	Yelloweye rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
146	Canary rockfish	1	1.00
146	Canary rockfish	2	1.00
146	Canary rockfish	3	0.98
146	Canary rockfish	4	0.88
146	Canary rockfish	5	0.60
146	Canary rockfish	7	0.60
146	Canary rockfish	8	0.50
146	Canary rockfish	22	0.22
146	Canary rockfish	98	1.00
146	Canary rockfish	99	1.00
147	Quillback rockfish	1	1.00
147	Quillback rockfish	2	1.00
147	Quillback rockfish	3	0.98
147	Quillback rockfish	4	0.88
147	Quillback rockfish	5	0.60
147	Quillback rockfish	8	0.50
147	Quillback rockfish	22	0.22
147	Quillback rockfish	98	1.00
147	Quillback rockfish	99	1.00
148	Tiger rockfish	1	1.00
148	Tiger rockfish	2	1.00
148	Tiger rockfish	3	0.98
148	Tiger rockfish	5	0.60
148	Tiger rockfish	22	0.22
148	Tiger rockfish	98	1.00
148	Tiger rockfish	99	1.00
149	China rockfish	1	1.00
149	China rockfish	2	1.00
149	China rockfish	3	0.98
149	China rockfish	5	0.60
149	China rockfish	8	0.50
149	China rockfish	9	0.60
149	China rockfish	22	0.22
149	China rockfish	98	1.00
149	China rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
150	Rosethorn rockfish	1	1.00
150	Rosethorn rockfish	2	1.00
150	Rosethorn rockfish	3	0.98
150	Rosethorn rockfish	12	0.65
150	Rosethorn rockfish	22	0.22
150	Rosethorn rockfish	98	1.00
150	Rosethorn rockfish	99	1.00
151	Rougheye rockfish	1	1.00
151	Rougheye rockfish	2	1.00
151	Rougheye rockfish	3	0.98
151	Rougheye rockfish	4	0.82
151	Rougheye rockfish	5	0.60
151	Rougheye rockfish	7	0.60
151	Rougheye rockfish	8	0.50
151	Rougheye rockfish	22	0.22
151	Rougheye rockfish	98	1.00
151	Rougheye rockfish	99	1.00
152	Shortraker rockfish	1	1.00
152	Shortraker rockfish	2	1.00
152	Shortraker rockfish	3	0.98
152	Shortraker rockfish	4	0.88
152	Shortraker rockfish	5	0.60
152	Shortraker rockfish	7	0.60
152	Shortraker rockfish	8	0.50
152	Shortraker rockfish	22	0.22
152	Shortraker rockfish	23	0.22
152	Shortraker rockfish	98	1.00
152	Shortraker rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
153	Redbanded rockfish	1	1.00
153	Redbanded rockfish	2	1.00
153	Redbanded rockfish	3	0.98
153	Redbanded rockfish	4	0.88
153	Redbanded rockfish	5	0.60
153	Redbanded rockfish	7	0.60
153	Redbanded rockfish	8	0.50
153	Redbanded rockfish	22	0.22
153	Redbanded rockfish	98	1.00
153	Redbanded rockfish	99	1.00
154	Dusky rockfish	1	1.00
154	Dusky rockfish	2	1.00
154	Dusky rockfish	3	0.98
154	Dusky rockfish	4	0.88
154	Dusky rockfish	5	0.60
154	Dusky rockfish	7	0.60
154	Dusky rockfish	8	0.50
154	Dusky rockfish	22	0.22
154	Dusky rockfish	98	1.00
154	Dusky rockfish	99	1.00
155	Yellowtail rockfish	1	1.00
155	Yellowtail rockfish	2	1.00
155	Yellowtail rockfish	3	0.98
155	Yellowtail rockfish	8	0.50
155	Yellowtail rockfish	22	0.22
155	Yellowtail rockfish	98	1.00
155	Yellowtail rockfish	99	1.00
156	Widow rockfish	1	1.00
156	Widow rockfish	2	1.00
156	Widow rockfish	3	0.98
156	Widow rockfish	22	0.22
156	Widow rockfish	98	1.00
156	Widow rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
157	Silvergray rockfish	1	1.00
157	Silvergray rockfish	2	1.00
157	Silvergray rockfish	3	0.98
157	Silvergray rockfish	5	0.60
157	Silvergray rockfish	8	0.50
157	Silvergray rockfish	22	0.22
157	Silvergray rockfish	98	1.00
157	Silvergray rockfish	99	1.00
158	Redstripe rockfish	1	1.00
158	Redstripe rockfish	2	1.00
158	Redstripe rockfish	3	0.98
158	Redstripe rockfish	8	0.50
158	Redstripe rockfish	22	0.22
158	Redstripe rockfish	98	1.00
158	Redstripe rockfish	99	1.00
159	Darkblotched rockfish	1	1.00
159	Darkblotched rockfish	2	1.00
159	Darkblotched rockfish	3	0.98
159	Darkblotched rockfish	4	0.88
159	Darkblotched rockfish	5	0.60
159	Darkblotched rockfish	8	0.50
159	Darkblotched rockfish	98	1.00
159	Darkblotched rockfish	99	1.00
160	Bullhead sculpin	1	1.00
160	Bullhead sculpin	2	1.00
160	Bullhead sculpin	3	0.98
160	Bullhead sculpin	5	0.65
160	Bullhead sculpin	98	1.00
160	Bullhead sculpin	99	1.00
165	Riffle sculpin	3	0.98
168	Unsp. Demersel shelf rockfish	1	1.00
168	Unsp. Demersel shelf rockfish	2	1.00
168	Unsp. Demersel shelf rockfish	3	0.98
168	Unsp. Demersel shelf rockfish	5	0.60
168	Unsp. Demersel shelf rockfish	8	0.50

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
169	Unsp. Pelagic shelf rockfish	1	1.00
169	Unsp. Pelagic shelf rockfish	3	0.98
169	Unsp. Pelagic shelf rockfish	5	0.60
193	Atka mackerel	1	1.00
193	Atka mackerel	2	1.00
193	Atka mackerel	3	0.98
193	Atka mackerel	4	0.87
193	Atka mackerel	5	0.61
193	Atka mackerel	98	1.00
193	Atka mackerel	99	1.00
270	Pollock	1	1.00
270	Pollock	2	1.00
270	Pollock	3	0.98
270	Pollock	4	0.80
270	Pollock	5	0.62
270	Pollock	8	0.72
270	Pollock	9	0.56
270	Pollock (total pollock)	14	0.065
270	Pollock (usable female pollock)	14	0.1375
270	Pollock	22	0.30
270	Pollock	23	0.25
270	Pollock	30	0.22
270	Pollock	31	0.50
270	Pollock	32	0.17
270	Pollock	98	1.00
270	Pollock	99	1.00
510	Smelt (general)	98	1.00
510	Smelt (general)	99	1.00
511	Eulachon smelt	1	1.00
511	Eulachon smelt	98	1.00
511	Eulachon smelt	99	1.00
689	Shark (general)	1	1.00
689	Shark (general)	2	1.00
689	Shark (general)	3	0.98
689	Shark (general)	4	0.85
689	Shark (general)	5	0.72
689	Shark (general)	98	1.00
689	Shark (general)	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
690	Salmon shark	1	1.00
690	Salmon shark	2	1.00
690	Salmon shark	3	0.98
690	Salmon shark	5	0.72
690	Salmon shark	98	1.00
690	Salmon shark	99	1.00
691	Spiny dogfish	1	1.00
691	Spiny dogfish	2	1.00
691	Spiny dogfish	3	0.98
691	Spiny dogfish	4	0.70
691	Spiny dogfish	98	1.00
691	Spiny dogfish	99	1.00
700	Skate	1	1.00
700	Skate	2	1.00
700	Skate	3	0.98
700	Skate	5	0.72
700	Skate	22	0.25
700	Skate	98	1.00
700	Skate	99	1.00
710	Sablefish (black cod)	1	1.00
710	Sablefish (black cod)	2	1.00
710	Sablefish (black cod)	3	0.98
710	Sablefish (black cod)	4	0.89
710	Sablefish (black cod)	5	0.68
710	Sablefish (black cod)	7	0.68
710	Sablefish (black cod)	8	0.62
710	Sablefish (black cod)	22	0.30
710	Sablefish (black cod)	23	0.25
710	Sablefish (black cod)	98	1.00
710	Sablefish (black cod)	99	1.00
870	octopus	1	1.00
870	octopus	3	0.98
870	octopus	4	0.90
870	octopus	5	0.85
870	octopus	98	1.00
870	octopus	99	1.00
875	Squid	1	1.00
875	Squid	2	1.00
875	Squid	98	1.00
875	Squid	99	1.00